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Applicants:	Anil D. Jha et al.
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Examiner:	Joseph W. Drodge
Art Unit:	1723

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APPELLANT'S BRIEF PURSUANT TO 37 C.F.R. § 41.37

Dear Sir:

This Appeal Brief is filed in response to the Office Action made Final mailed on January 11, 2007. A fee of $510 under C.F.R. § 41.20(a)(2) is being paid herewith. Any additional fees that are required for consideration of this paper are authorized to be charged to the Deposit Account identified on the copies of the Transmittal of Appeal Brief filed herewith.

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I. Real Party in Interest (37 C.F.R. § 41.37(c)(1)(i))

The real party in interest in this application is the assignee, Siemens Water Technologies Holding Corp., having a place of business at 181 Thorn Hill Road, Warrendale, Pennsylvania 15086 (hereinafter "Appellant").

II. Related Appeals and Interferences (37 C.F.R. § 41.37(c)(1)(ii))

There are no other appeals, interferences, or judicial proceedings known to Appellant, Appellant's legal representatives, or assignee that are related to, will directly affect, be directly affected by, or have a bearing on the Board's decision in this pending appeal.

III. Status of Claims (37 C.F.R. § 41.37(c)(1)(iii))

Claims 1-70 were originally filed in this application.

Claims 1-20, 30-39, 46-50, 52, and 55-61 were previously canceled without prejudice or disclaimer.

Claims 21-29, 40-45, 51, 53-54, and 62-70 are pending in this application, of which claims 21, 40, 51, 62, 68, and 70 are independent claims.

Each of pending claims 21-29, 40-45, 51, 53, 54, and 62-70 was rejected in a final Office Action dated January 11, 2007.

Appellant appeals the rejection of claims 21-29, 40-45, 51, 53-54, and 62-70. A copy of the appealed claims as pending is attached as a Claims Appendix.

The status of the claims is as follows:

A. Claims 21-26, 40-41, and 44-45 were rejected under 35 U.S.C. § 102(e) as being anticipated by Willman et al. in U.S. Patent Application Publication No. US2004/0118780 (hereinafter "Willman");

B. Claims 51-54, 62, 65, and 68-70 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hirayama et al. in U.S. Patent No. 6,461,512 (hereinafter "Hirayama");

C. Claims 62, 65-67, and 69-70 were rejected under 35 U.S.C. § 102(e) as being anticipated by Willman;

D. Claim 26 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Willman in view of Rela in U.S. Patent No. 6,607,688 (hereinafter "Rela");

E. Claims 27 and 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Willman in view of Sato et al. in U.S. Patent No. 6,733,646 (hereinafter "Sato");

F. Claim 28 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Willman in view of Hirayama;

G. Claims 29 and 43 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Willman in view of the teaching in U.S. Patent No. 6,398,965 to Arba et al. (hereinafter "Arba"); and

H. Claims 63 and 64 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Hirayama in view of Sato.

IV. Status of Amendments (37 C.F.R. § 41.37(c)(1)(iv))

An amendment to claim 21 was filed in a Supplemental Response under C.F.R. § 1.116 mailed on December 13, 2006 in response to the Office Action mailed on August 9, 2006. Claim 52 was canceled.

No claims have been amended after the final Office Action dated January 11, 2007.

A copy of the claims as pending, incorporating any prior amendments and showing the status of each of the claims, is attached as a Claims Appendix.

V. Summary of Claimed Subject Matter (37 C.F.R. § 41.37(c)(1)(v))

The subject matter of the present invention is directed generally to a system and method of treating or purifying a fluid and, more particularly, to a water treatment system incorporating an electrochemical device with a reservoir system for delivering treated water to a point of use. (Specification at page 1, lines 9-11; FIG. 1, FIG. 3, and FIG. 5).

FIG. 1 (reproduced below) shows a treatment system of the present invention comprising an in-line system with a pressurized reservoir system 12 and a treatment device 16.

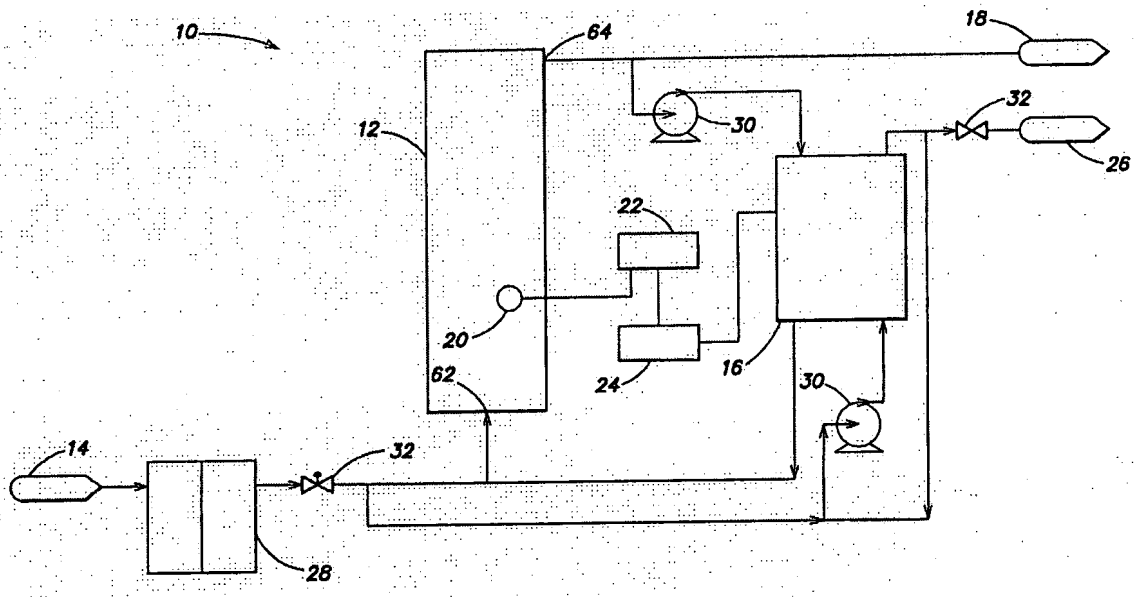
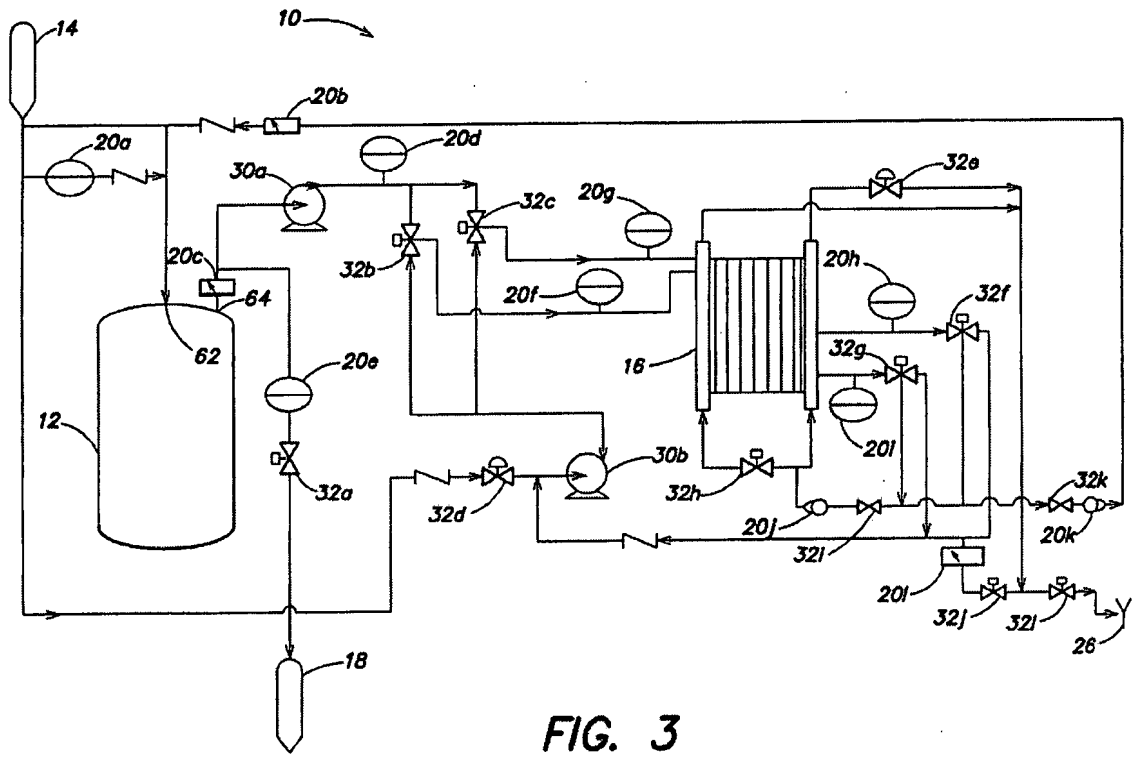


FIG. 1

FIGS. 3 and 5 (reproduced below) show schematic diagrams of water treatment systems of the present invention.


14
10
20b
20a
20d
30a
32c
20g
32e
20c
32b
64
20f
20h
32f
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16
32g
20e
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201
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32d
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32k
20j
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32j
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26
18

FIG. 3

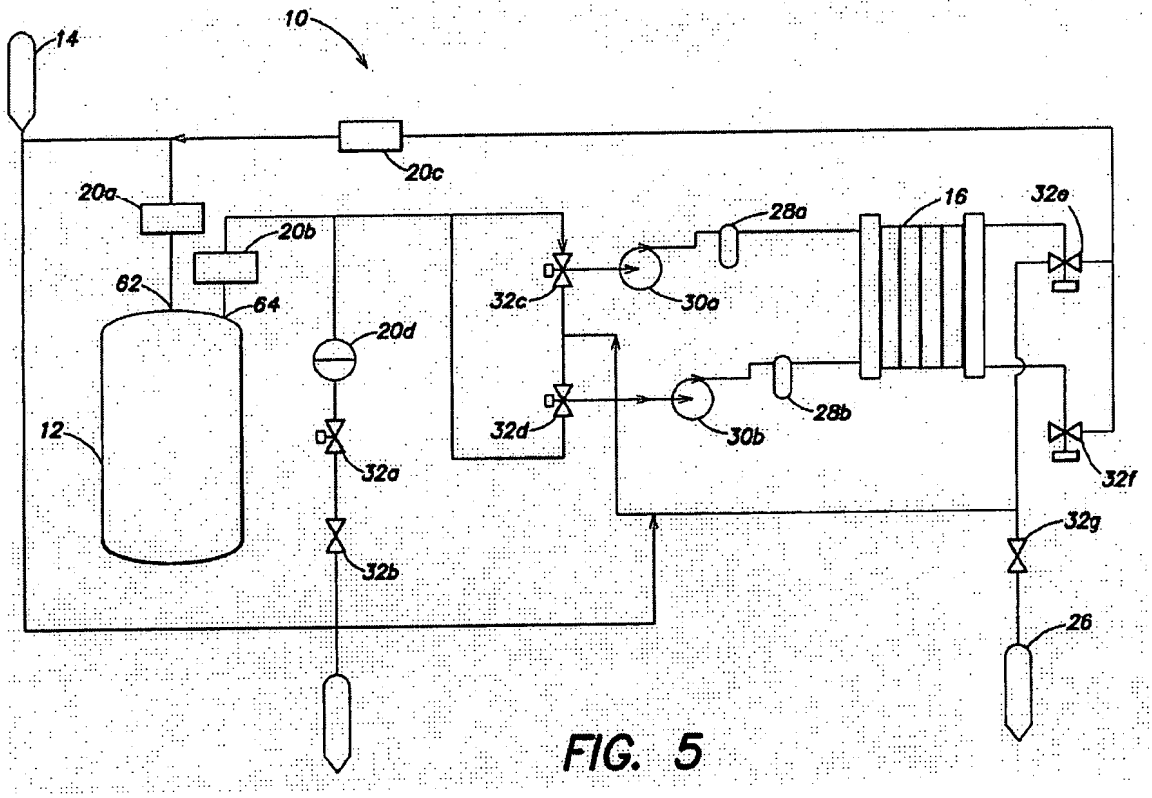

14
10
20c
20a
20b
28a
16
32e
62
64
32c
30a
20d
12
28b
32d
30b
32a
32f
32b
32g
26

FIG. 5

The subject matter of independent claim 21 is directed a treatment system 10 comprising a reservoir system 12 fluidly connected to a point of entry 14, an electrochemical device 16 fluidly connected to the reservoir system 12, a point of use 18 fluidly connected to the reservoir system 12, and an auxiliary use 26 fluidly connected to a waste stream from the electrochemical device 16. Support for the subject matter of claim 1 is provided at page 3, lines 13-16; at page 6, line 32 to page 7, line 10; at page 11, line 26 to page 12, line 2; and at page 16, lines 16-20 of the Specification as originally filed.

The subject matter of independent claim 40 is directed to a method for treating water comprising introducing water from a point of entry 14 to a reservoir system 12, removing at least a portion of any undesirable species from the water in the reservoir system 12 in an electrochemical device 16 to produce treated water and discharge water, transferring at least a portion of the treated water from the electrochemical device 16 to the reservoir system 12, transferring a portion of the discharge water to an auxiliary use 26 , and distributing a portion of the treated water from the reservoir system 12 to a point of use 18. Support for the subject matter of claim 40 is provided at page 3, lines 24-30; at page 6, line 32 to page 7, line 10; at page 10, lines 25-29; and at page 11, line 26 to page 12, line 2 of the Specification as originally filed.

The subject matter of independent claim 51 is directed to a water treatment system provided comprising means for accumulating water 12 from a water source 14 at a pressure above atmospheric pressure, an electrochemical device 16 fluidly connected to the means for accumulating water 12, means for heating the water, and a household distribution system 18 . Support for the subject matter of claim 51 is provided at page 4, lines 4-7; at page 6, line 32 to page 7, line 10; at page 7, line 16-22; at page 11, lines 5-23; and at page 12, lines 12-27 of the Specification as originally filed. In one embodiment of the invention, the means for accumulating water may comprise a reservoir system 12 such as one or more pressurized vessels that serves to store water from a point of entry 14 and can also serve to store water from an electrochemical device 16. (Specification at page 7, lines 16-22 and at page 10, line 25 to page 11, line 8.) In

one embodiment of the invention, the means for heating the water may comprise a heater, heat exchanger, or a heating coil which can have heating fluid from a furnace or other heat generating unit operation. (Specification at page 11, lines 5-14.)

The subject matter of independent claim 62 is directed to a method for treating water comprising accumulating water from a point of entry 12 at a pressure that is above atmospheric pressure, providing an electrochemical device 16, transferring at least a portion of the accumulated water to the electrochemical device 16, removing at least a portion of any undesirable species from the water in the electrochemical device 16 to produce a treated water, and adjusting at least one operating parameter of the electrochemical device. (Specification at page 4, lines 13-16; at page 10, lines 25-33; at page 12, lines 3-27; at page 14, lines 4-8; at page 14, line 20 to page 15, line 31; at page 15, line 32 to page 16, line 15; and at Examples 1 and 2.)

The subject matter of independent claim 68 is directed to a system comprising a pressurized fluid reservoir 12 in thermal communication with a heat exchanger and a fluid treatment device 16 fluidly connected to the pressurized fluid reservoir 12, wherein the fluid treatment device 16 comprises a device selected from the group consisting of an electrochemical device and a reverse osmosis device. (Specification at page 4, lines 23-25; at page 7, line 16 to page 8, line 7; at page 10, line 25 to page 11, line 20; at page 11, line 21 to page 12, line 2; as well as at Examples 1 and 2.)

The subject matter of independent claim 70 is directed to a method for facilitating water treatment. The method can comprises providing a system comprising a pressurizable reservoir system 12 that is fluidly connectable to a point of entry 14 and an electrochemical device 16 fluidly connected to the pressurizable reservoir system 12 and fluidly connectable to a water distribution system. (Specification at page 4, lines 26-30; at page 7, lines 16-22; at page 10, line 25 to page 11, line 20; at page 11, line 26 to page 12, line 11; and at page 12, lines 12-27.)

Further, discussion particularly relevant to the electrochemical device 16 can be found at page 7, line 25 to page 10, line 24, with reference to FIG. 2.

VI. Grounds of Rejection to be Reviewed on Appeal (37 C.F.R. § 41.37(c)(1)(vi))

A. Whether claims 21-26, 40-41, and 44-45 are anticipated under 35 U.S.C. § 102(e) by Willman.

B. Whether claims 51-54, 62, 65, and 68-70 are anticipated under 35 U.S.C. § 102(b) by Hirayama.

C. Whether claims 62, 65-67, and 69-70 are anticipated under 35 U.S.C. § 102(e) by Willman.

D. Whether claim 26 is unpatentable under 35 U.S.C. § 103(a) over Willman in view of Rela.

E. Whether claims 27 and 42 are unpatentable under 35 U.S.C. § 103(a) over Willman in view of Sato.

F. Whether claim 28 is unpatentable under 35 U.S.C. § 103(a) over Willman in view of Hirayama.

G. Whether claims 29 and 43 are unpatentable under 35 U.S.C. § 103(a) over Willman in view of Arba.

H. Whether claims 63 and 64 are unpatentable under 35 U.S.C. § 103(a) over Hirayama in view of Sato.

VII. Argument (37 C.F.R. § 41.37(c)(1)(vii))

A. Discussion of the Prior Art

1. Willman in U.S. Patent Application Publication No. US2004/0118780

Willman discloses a water purification system 10 and a method of producing high-purity, laboratory-quality water involving utilizing a reverse osmosis device 18. (Paragraph 0016.) Willman further discloses utilizing a capacitive deionization module 20 to purify the reject water stream or concentrate from the reverse osmosis device 18. (Abstract and paragraph 0020.) Purified water from the module 20 is then directed to the reverse osmosis device 18 thereby improving the overall system water recovery rate. (Paragraph 0020.)

In FIG. 1 (reproduced below), Willman discloses a water purification system 10 with a pretreatment stage 12, a pressure regulator 14, a booster pump 16, a reverse osmosis unit 18, a capacitive deionization module 20, and a drain 22. A stream of feed water from a feed water source 24 is provided to pretreatment stage 12 and a stream of purified product water is transferred to a storage tank 26. Storage tank 26 receives and holds high-purity product water from water purification system 10. A dispenser 28 can dispense the purified product water from storage tank 26. (Paragraph 0016.)

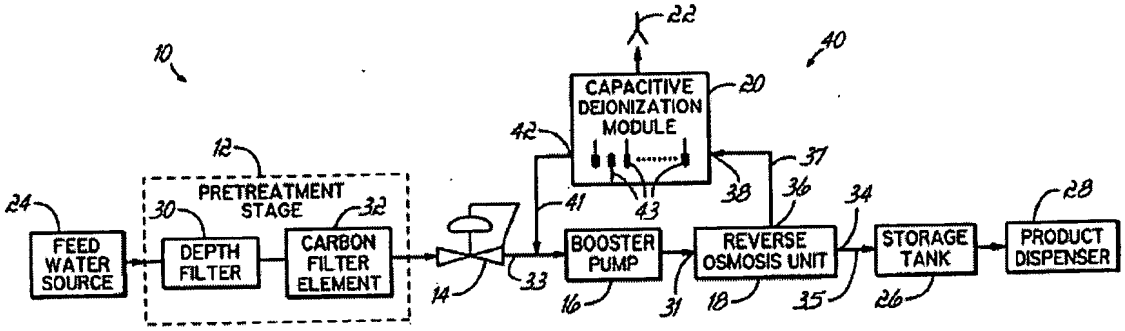


FIG. 1

Capacitive deionization module 20 is disposed in a recirculation path 40 that removes residual dissolved ions in the concentrate stream from reverse osmosis unit 18 and delivers an output stream with significantly less dissolved ions to reverse osmosis

unit 18. (Paragraph 0020.) Willman emphasizes that the principles of the invention significantly conserve water and reduces the volume sent to drain 22. (Paragraph 0025.)

In FIG. 2 (reproduced below), Willman discloses a water purification system 10 with a secondary purification element, deionization module 50, which utilizes an ion exchange resin bed, positioned in the fluid path and downstream from reverse osmosis unit 18 and storage tank 26, or generally downstream from the water purification system 10. (Paragraph 0027.)

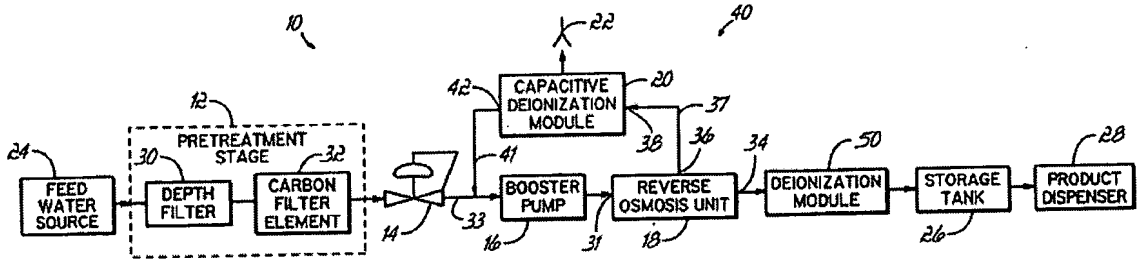


FIG. 2

In FIG. 3 (reproduced below), Willman discloses a water purification system 10 in which storage tank 26 is disposed in a recirculation path 52 that includes an ultraviolet light treatment unit 54 and a deionization module 56. The high-purity product is pumped from storage tank 26 by a transfer pump 58 through light treatment unit 54 and returned to storage tank 26. (Paragraph 0029.) Pump 58, disposed downstream of storage tank 26, thus pressurizes the purified water from storage tank 26.

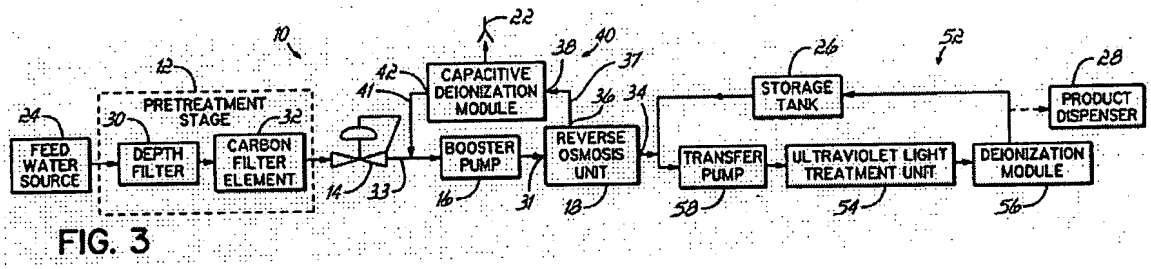


FIG. 3

In FIG. 4 (reproduced below), Willman discloses a water purification system having a recirculation path 62 involving a pair of capacitive deionization modules 64 and 66. Inlets 69 and 70 of capacitive deionization modules 64 and 66 are fluidly coupled to a concentrate outlet 36 of reverse osmosis unit 18. Purified water from modules 64 and 66 is then delivered to the inlet of reverse osmosis unit 18. (Willman at paragraphs 0030 to 0032.) Permeate from reverse osmosis unit 18 is directed to storage tank 26 by way of

a three-way fitting 93. A recirculation path 92 couples permeate outlet 34 to the inlet of reverse osmosis unit 18. Three-way fitting 93 allows for selective coupling of the exiting permeate stream and storage tank 26 or to a product dispenser 104 by way of another three-way fitting 100 through recirculation path 92. (Willman at paragraphs 0033 to 0036.) Notably, product dispenser 104 and product dispenser 28 provide high-purity water.

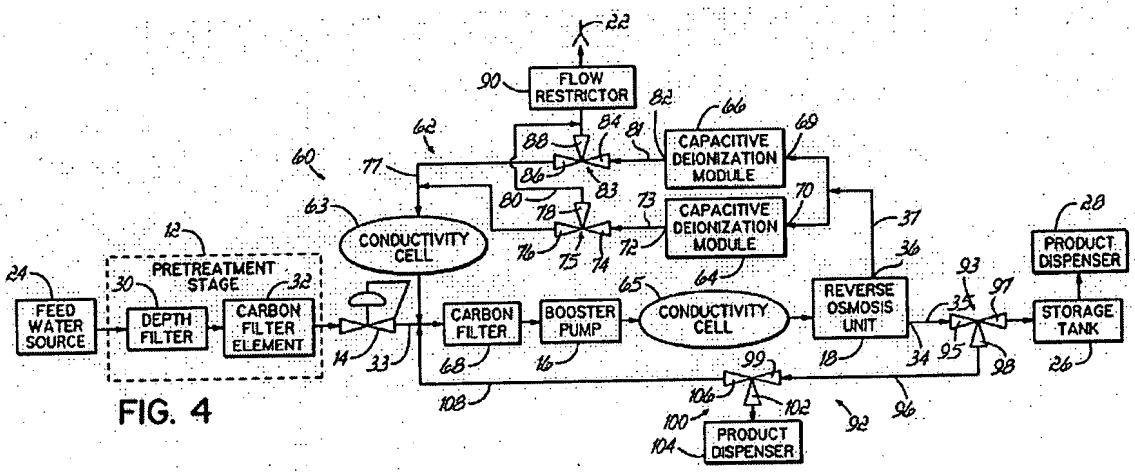


FIG. 4

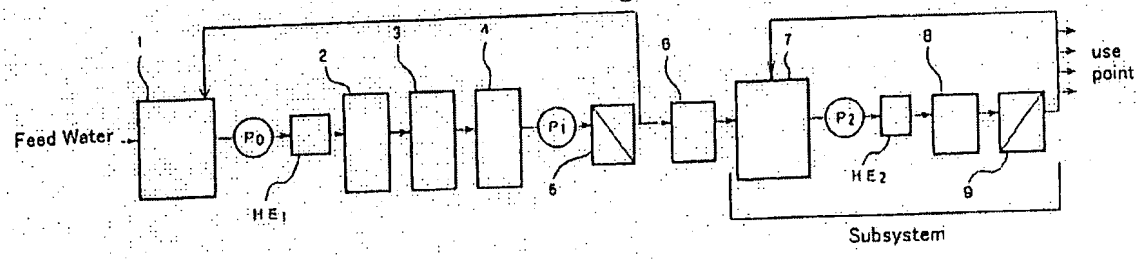
2. Hirayama in U.S. Patent No. 6,461,512

Hirayama discloses a method of disinfecting a deionized water-producing apparatus and a method of producing deionized water. The deionized water-producing apparatus includes a pretreatment apparatus including a reverse osmosis apparatus, and an electrodeionization apparatus having a diluting compartment filled with ion exchange material. Hot water greater than 80°C is passed through the pretreatment apparatus and hot water greater than 60°C is gradually passed through the electrodeionization apparatus at a rate of 0.1-10°C per minute. (Abstract and at column 2, lines 30-49.)

In FIG. 2a (reproduced below), Hirayama discloses a conventional system for producing purified water. Raw water from tank 1 is treated with an activated carbon column 2, a safety filter 3, and a membrane degassing apparatus 4. Water is delivered by a pump P_0 from tank 1 to a heat exchanger HE_1. Water is then pressurized by a pump P_1 and treated with a reverse osmosis membrane apparatus 5 and an electrodeionization apparatus 6. The product water is further treated with a subsystem comprising an

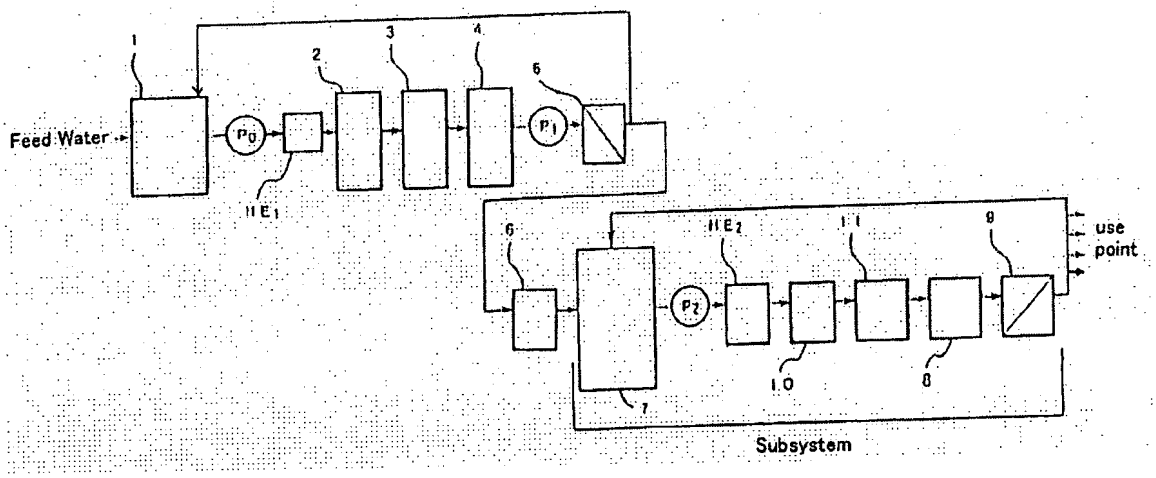
ultraviolet disinfecting apparatus 8 and an ultrafiltration membrane apparatus 9 by way of a tank 7, a pump P_2 and a heat exchanger HE_2. Product water is delivered to a point of use from ultrafiltration membrane apparatus 9. (Column 1, lines 14-31.)

Fig. 2a



In FIG. 2b (reproduced below), Hirayama discloses another configuration of a conventional system for producing purified water for the semiconductor manufacturing industry. Raw water is treated with an activated carbon column 2, a safety filter 3, and a membrane degassing apparatus 4 by way of a tank 1, a pump P_0 and a heat exchanger HE_1 and then pressurized by a pump P_1. The water is then treated with a reverse osmosis membrane apparatus 5 and an electrodeionization apparatus 6. The water is also treated with a subsystem comprising a low-pressure ultraviolet oxidizing apparatus 10, a mixed-bed ion exchange apparatus 11, an ultraviolet disinfecting apparatus 8 and an ultrafiltration membrane apparatus 9 for delivery to a use point. (Column 1, lines 32-46.)

Fig. 2b



In FIGS. 1a and 1b (reproduced below), Hirayama discloses a system receiving raw water from tank 1 and heated by a heat exchanger HE_1 to 80°C or higher. The hot

water disinfects a reverse osmosis apparatus 5. After disinfecting reverse osmosis apparatus 5, ambient temperature water from tank 1 is introduced into, and permeate water is retrieved from, reverse osmosis apparatus 5. The permeate water, heated to 60°C or higher, disinfects electrodeionization apparatus 6. (Column 3, lines 7-26.)

Fig. 1a

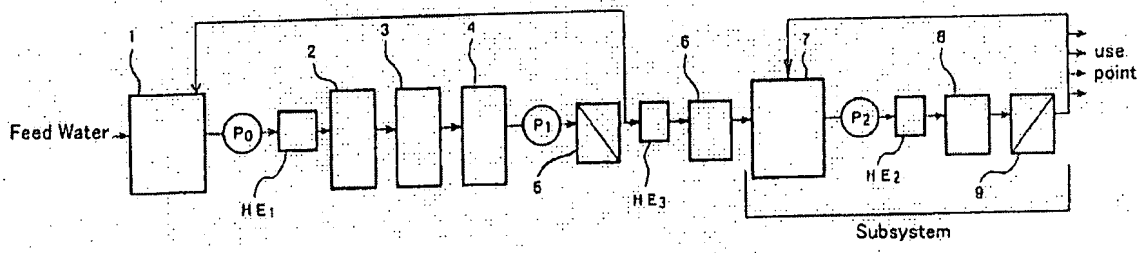
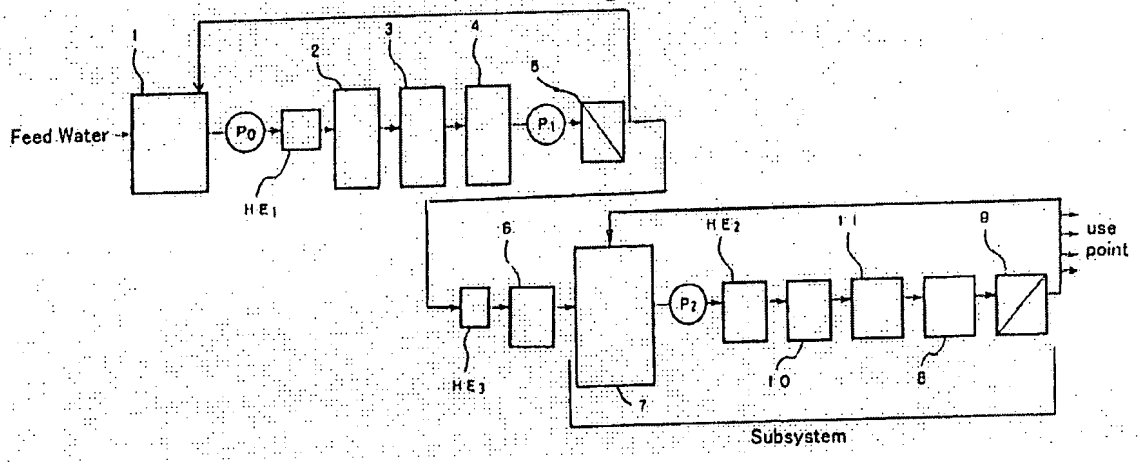
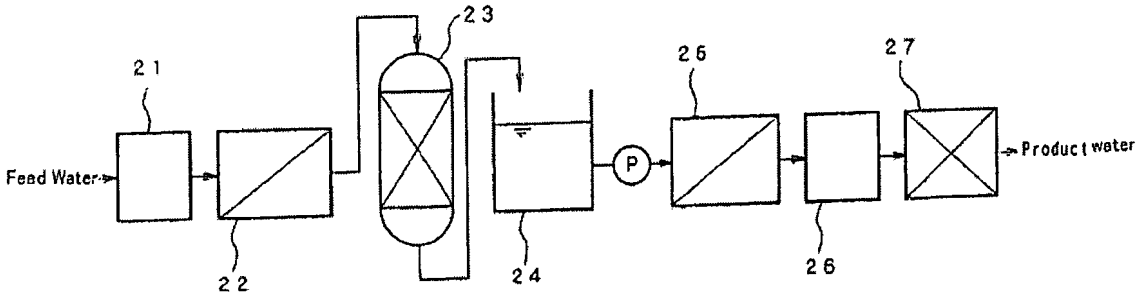


Fig. 1b



In FIG. 3 (reproduced below), Hirayama discloses a system that receives city water into a heat exchanger 21 and treating the water in a microfiltration apparatus 22 and an activated carbon tower 23 before being fed into tank 24. Water from tank 24 is introduced into a reverse osmosis apparatus 25 after being pressurized by pump P and then treated by an electrodeionization apparatus 27 into product water. (Example 1.) Notably, tank 24 is depicted as a tank open to atmospheric pressure.

Fig. 3



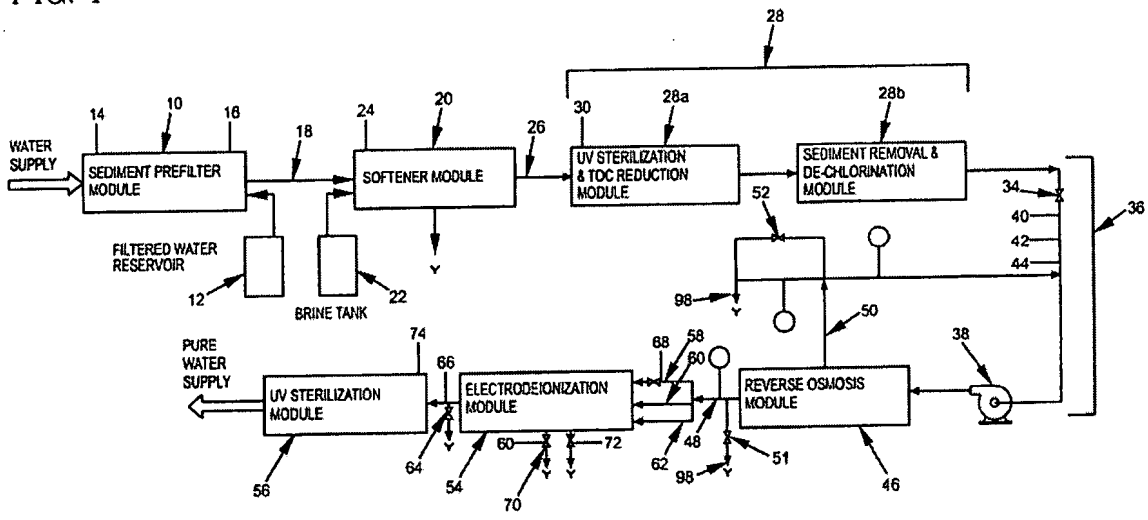
3. Rela in U.S. Patent No. 6,607,668

Rela discloses a water purifier using membranes, ion exchange resins and electricity to remove ionic, organic and suspended impurities from water to produce high quality, pure water. Raw water is pretreated prior to primary and secondary processing.

In FIG. 1 (reproduced below), Rela discloses a water purification process with a first pretreatment module with a sediment pre-filter module 10 with pressure sensors 14 and 16. (Column 5, lines 46-54 and column 6, lines 15-17.) After particles are removed in pre-filter module 10, water is directed through a conduit 18 to a softener module 20 which removes hard minerals. (Column 6, lines 38-44.) From softener module 20, water is directed to a de-chlorination module 28 which includes an ultraviolet sterilization and total organic carbon reduction stage 28a and a sediment removal and de-chlorination stage 28b. (Column 7, lines 41-49.) Water from the module 28, which has been pretreated and preconditioned, is introduced into a primary purification stage. Water from module 28 flows to a pressurization pump module 36 with a pump 38. (Column 8, lines 36-41.) Pump 38 provides pressurized water to a reverse osmosis module 46 which separates the water into purified water, permeate, and concentrated wastewater, concentrate. (Column 9, lines 4-17.) The concentrate is divided into a recycle stream, which is directed into the primary processing module with the feed water, and a waste stream, which is directed to a local waste system. (Column 9, lines 23-41.) The permeate is directed to a secondary processing module with an electrodeionization module 54. (Column 9, lines 18-22 and column 10, lines 3-11.) Product, pure water

from electrodeionization module 54 is passed through a final post-treatment conditioning module 56 which sterilizes the pure water. (Column 10, lines 47-61.) A control system (not shown) calculates the required electrical voltage and current required by the electrodeionization module 54 and automatically adjusts each to achieve optimum water quality. (Column 10, lines 24-46.)

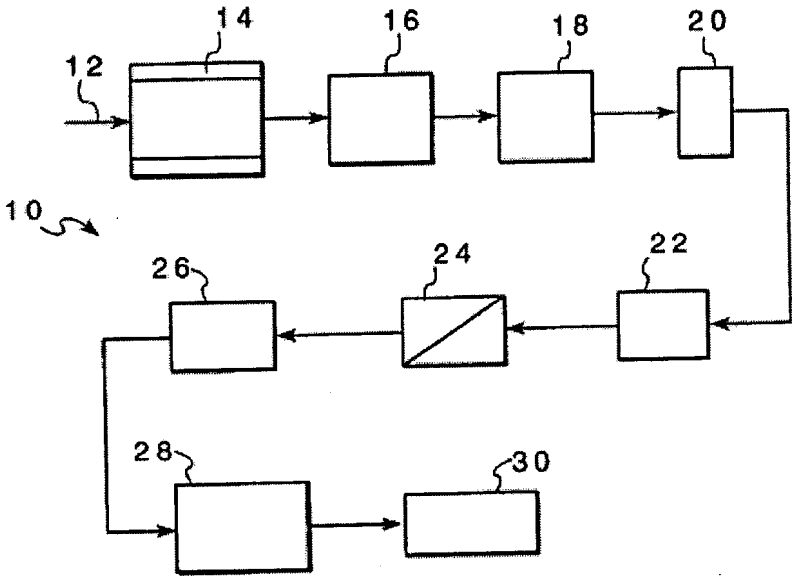
FIG. 1



4. Arba in U.S. Patent No. 6,398,965

Arba discloses a water treatment system and process for producing purified water for high purity applications. In FIG. 1 (reproduced below), Arba shows a flow diagram of a water treatment system 10 producing water purified for pharmaceutical applications for drug manufacture, injection of drugs, irrigation, and inhalation. (Column 1, lines 46-54.) Feed water is fed into a media filter unit 14 to remove bulk particulate materials. The water is then passed through a water softener 16, a heat exchanger 18, a de-chlorination unit 20, and a cartridge filtration unit 22. Water is then introduced into a reverse osmosis unit 24. Permeate from the reverse osmosis unit is then passed to a distillation unit 26 to produce the water for injection. A storage tank 28 can store the distilled water prior to use in production or in packaging in unit 30. (Column 2, lines 23-60.) Arba explains that the sterile water can be used for tissue irrigation during surgical procedures. (Column 2, lines 18-22.)

FIGURE 1
(PRIOR ART)



5. Sato in U.S. Patent No. 6,733,466

Sato discloses that deionized water can be used for various purposes such as in semiconductor production, liquid crystal display production, in the pharmaceutical industry, in food production, and in households. (Column 1, lines 11-14.) Sato, however, clarifies that the invention provides an electrodeionization apparatus and a method of operating the electrodeionization apparatus as well as a system employing the electrodeionization apparatus for producing ultra pure water. (Column 2, lines 17-21.)

B. Claims 21-26 cannot be anticipated under 35 U.S.C. § 102(e) by Willman

Willman cannot anticipate the subject matter of independent claims 21-26 because Willman does not teach each and every element of these claims.

Independent claim 21 claims a treatment system comprising a reservoir system fluidly connected to a point of entry, an electrochemical device fluidly connected to the reservoir system, a point of use fluidly connected to the reservoir system, and an auxiliary use fluidly connected to a waste stream from the electrochemical device.

Willman fails to disclose a treatment system comprising a reservoir system fluidly connected to a point of entry, an electrochemical device fluidly connected to the reservoir system, a point of use fluidly connected to the reservoir system, and an auxiliary use fluidly connected downstream of the electrochemical device. MPEP § 2131 (citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."))

In particular, Willman fails to disclose a treatment system comprising an auxiliary use, or even an auxiliary use fluidly connected downstream of an electrochemical device. As noted on page 16 of the present specification as originally filed, discharge water from a waste stream can be delivered to an auxiliary use to provide additional or secondary benefits. Thus, instead of being discharged to a drain, the waste stream can be advantageously used to provide secondary benefits such as irrigating vegetation. Willman, in contrast, fails to recognize this utility and, as is conventional in the field, discharges the waste stream to drain 22. Because the invention as claimed in independent claim 21 was not described in an application for patent by another, Willman cannot anticipate independent claim 21. 35 U.S.C. § 102(e), MPEP 2136.02 (The disclosure relied on in the rejection must be present in the application publication.)

The reliance on an auxiliary use 104 as disclosed by Willman is misplaced because an auxiliary use as presently claimed refers to providing non-purified water, byproduct waste water from the electrochemical device to an auxiliary use. Willman, in contrast, provides permeate water, or purified water, to a product dispenser 104. (Paragraph 0035.) Willman, as noted above, discharges waste from the capacitive deionization module to a drain 22. Willman thus fails to recognize any ancillary uses for the byproduct waste water from an electrochemical device and cannot disclose a system comprising an auxiliary use fluidly connected to a waste stream from an electrochemical device. Therefore, Willman cannot anticipate independent claim 21 because Willman fails to teach each and every element recited therein.

As noted, Willman discloses a system comprising a reverse osmosis unit, with a poreless membrane, disposed between a feed water source and a storage tank. Because the reverse osmosis unit utilizes a poreless membrane, the storage tank cannot be fluidly connected to the feed water source because the poreless membrane fluidly isolates the storage tank from the feed water source. Thus, Willman cannot disclose a treatment system comprising a reservoir system fluidly connected to a point of entry.

Therefore, independent claim 21 cannot be anticipated by Willman because the reference fails to teach each and every element recited therein.

Claims 22-26 depend from independent claim 21. These claims also cannot be anticipated by Willman for at least the reason mentioned above. Indeed, Willman fails to disclose a treatment system comprising a pressurized reservoir system, a pretreatment system comprising a reverse osmosis device, and a controller for regulating at least one operating parameter of the treatment system. Because Willman discloses utilizing a reverse osmosis unit as a primary treatment unit operation, Willman cannot disclose a system that utilizes a reverse osmosis unit in a pretreatment stage. Although Willman discloses a pump 16 that delivers water to be treated to reverse osmosis unit 18, there is no teaching that storage tank 26, or the contents thereof, is pressurized. This is significant in view of Willman's disclosure that the pump simply serves to provide an adequate driving force for the operation of the reverse osmosis unit, without any mention as to any condition or state of the high-purity water in storage tank 26. (Willman at paragraph 0018 to 0019.) Indeed, no reasoned explanation has been set forth supporting the notion that the storage tank must necessarily be pressurized. To be sure, no explanation has been set forth that a person skilled in the art would recognize that the storage tank is pressurized beyond mere probability or possibility and it is equally speculative that the contents of storage tank 26 is under atmospheric pressure, and flow to the product dispenser is merely facilitated by a hydrostatic head. MPEP § 2131.01 (citing Continental Can Co. USA v. Monsanto Co., 948 F.2d 1264, 1268 ("To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence

must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill."))

Further, Willman at paragraph 0022 does not inherently require a controller that controls the current to the electrochemical device. Instead, Willman notes that the polarity of the applied electrical potential to the capacitive deionization module is reversed after providing 75 volumes of purified water. This can be effected manually and does not necessarily require a control system. Thus, no reasoned explanation has been set forth that makes clear that the control system is necessarily present or that one skilled in the art would recognize one as necessarily required.

Therefore, because Willman fails to disclose each and every element respectively recited in dependent claims 22-26, these dependent claims cannot be anticipated by Willman.

C. Claims 40-41 and 44-45 cannot be anticipated under 35 U.S.C. § 102(e) by Willman

Willman cannot anticipate the subject matter of claims 40, 41, 44, and 45 because Willman does not teach each and every element of these claims.

Independent claim 40 claims a method for treating water comprising transferring a portion of discharge water to an auxiliary use.

Willman discharges waste water to drain 22 and fails to recognize the advantages associated with utilizing a portion of waste water from an electrochemical device to an auxiliary use. The reliance on an auxiliary use 104 is misplaced. Willman explains that purified permeate water from reverse osmosis unit 36 is delivered to a product dispenser 104. (Willman at paragraphs 0034 and 0035.) Thus, Willman cannot disclose a method of treating water comprising transferring a portion of discharge water from an electrochemical device to an auxiliary use.

Therefore, Willman cannot anticipate independent claim 40 because the reference fails to disclose each and every recited element.

Dependent claims 41 and 44-45 depend from independent claim 40. These claims also cannot be anticipated by Willman for at least the same reasons discussed above. Further, Willman fails to disclose each of the elements respectively recited in these dependent claims. For example, Willman fails to disclose a method comprising adjusting an operating parameter of the electrochemical device. Therefore, dependent claims 41, 44, and 45 also cannot be anticipated by Willman.

D. Claims 51, 53, and 54 cannot be anticipated under 35 U.S.C. § 102(b) by Hirayama

Hirayama cannot anticipate the subject matter of claims 51, 53, and 54 because Hirayama fails to teach each and every element recited in these claims.

Hirayama discloses a disinfection method for conventional treatment apparatus that produce high quality deionized water. (Hirayama at column 2, lines 24 to 29.) The disclosed apparatus utilizes a reverse osmosis device 5 between a raw water source and an electrodeionization device 6. (Hirayama at FIGS. 1a, 1b, 2a, 2b, and 3 and at column 1, lines 18 to 26.) Hirayama, however, fails to disclose that any of tanks 1 and 7 accumulate water from a water source at a pressure that is above atmospheric pressure. Contrary to what has been asserted, tanks 1 or 7 are not necessarily at a pressure above atmospheric pressure because in each and every embodiment disclosed by Hirayama, a pump P, P_0, or P_2, is disposed to withdraw water from a tank. Because the pumps are downstream from the tanks, any notion that any of tanks 1, 7 or 24 must necessarily accumulate water at a pressure that is above atmospheric pressure cannot be sensible.[1] Indeed, since Hirayama explicitly utilizes pumps downstream of a tank to provide pressurized water, one skilled in the art would conclude that the tanks are not pressurized at above atmospheric pressure because a pressurized tank would not require a pump to deliver water to downstream unit operations.

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[1] Appellants further note that tank 24 in FIG. 3 is depicted as an open top tank and, as such, must be at atmospheric pressure and therefore cannot be a structure associated with a pressurized reservoir system or means for accumulating water at a pressure above atmospheric pressure.

Hirayama also fails to disclose a water treatment system comprising a household water distribution system. Instead, Hirayama discloses providing purified water for pharmaceutical or semiconductor manufacturing.

Thus, independent claim 51 cannot be anticipated by Hirayama because this reference fails to disclose each and every element recited therein.

Dependent claims 53 and 54 depend from independent claim 51. For at least the same reasons mentioned above, these claims also cannot be anticipated by Hirayama as well as for the elements respectively recited therein. For example, Hirayama does not disclose a treatment system comprising means for adjusting an operating parameter of at least one of the electrochemical device, means for accumulating water, and a household water distribution system. Although Hirayama discloses, at Example 1, not applying an electric current through an electrodeionization apparatus, such a condition cannot be considered as or imply means for adjusting an operating parameter because no structure has been disclosed and because there is no indication as to how any operating parameter is adjusted. Thus, any reliance on a non-enabled feature, much less a non-disclosed apparatus, is misplaced. Therefore, dependent claims 53 and 54 also cannot be anticipated by Hirayama because the reference fails to disclose each and every recited element.

Dependent claim 52 was canceled without prejudice or disclaimer.

E. Claims 62 and 65 cannot be anticipated under 35 U.S.C. § 102(b) by Hirayama

Hirayama also cannot anticipate the subject matter of claims 62 and 65 because Hirayama fails to teach each and every element recited in these claims.

In particular, Hirayama fails to disclose a method of treating water comprising accumulating water from a point of entry at a pressure that is above atmospheric pressure. As noted above, no discussion or explanation has been particularly identified to support the notion that any of the tanks necessarily accumulate water at a pressure that is above atmospheric pressure. Again, because all of Hirayama's disclosed embodiments depict

pumps downstream of, and having a suction side directly connected to, a tank, no inference can be made that the tanks necessarily accumulate water at above atmospheric pressure. Instead Hirayama's disclosure must be considered as accumulating water that is not above atmospheric pressure.

Further, Hirayama fails to disclose a method comprising adjusting at least one operating parameter of an electrochemical device. The reliance on the passage at column 4, lines 66-67 cannot support the *prima facie* case of anticipation because there is no cogent explanation as to adjusting an operating parameter. The cited passage mentions that "electrodeionization apparatus 27 was not flown with electric current during the second step." Hirayama explains that during the second step, the temperature of hot water introduced into the electrodeionization apparatus 27 was gradually increased, maintained at a temperature of 60°C, and then the hot water temperature was gradually decreased. (Hirayama at column 4, lines 52 *et seq.*) Hirayama notes that during this second disinfection step, the electrodeionization apparatus was not operated because no current was applied through the apparatus. The reliance on the cited passage is clearly improper. Adjusting an operating parameter of an electrochemical device requires operating the device. If the device is idle, none of its operating parameters can be adjusted. Further, adjusting an operating parameter typically involves receiving an input signal and generating an output signal in response to the input signal, and, in some cases, also relative to a set point or target parameter. Hirayama fails to disclose what operating parameter is adjusted much less how any operating parameter is adjusted.

Therefore, Hirayama cannot anticipate independent claim 62 because Hirayama fails to disclose each and every recited element.

Dependent claim 65 depends from independent claim 62. Hirayama also cannot anticipate this dependent claim for at least the reasons discussed above. Further,

Hirayama fails to disclose a method comprising calculating a desired property of the treated water.[2]

Therefore, dependent claim 65 also cannot be anticipated by Hirayama.

F. Claims 68 and 69 cannot be anticipated under 35 U.S.C. § 102(b) by Hirayama

Hirayama cannot anticipate the subject matter of independent claim 68 because Hirayama fails to teach each and every element recited therein.

Independent claim 68 claims a system comprising a pressurized fluid reservoir in thermal communication with a heat exchanger. Hirayama, as noted, fails to disclose a system comprising a pressurized fluid reservoir. Further, no cogent explanation has been set forth that supports the notion that the tanks disclosed by Hirayama must necessarily be pressurized. Hirayama utilizes pumps fluidly connected downstream of tanks to facilitate deliver of water to downstream unit operations. Hirayama's flow configuration recognizes that the pressure of the water in the tanks must be raised to facilitate delivery to the downstream unit operations. Because all of Hirayama's disclosed embodiments include pumps having a suction side directly connected to a tank, there can be no valid basis for the assertion that the tanks accumulate water at above atmospheric pressure. Thus, Hirayama does not and indeed, cannot disclose a pressurized fluid reservoir. Therefore, the *prima facie* case of anticipation is defective because the reference does not disclose each and every element recited in independent claim 68.

Dependent claim 69 depends from independent claim 68 and cannot be anticipated by Hirayama for at least the same reasons mentioned above.

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[2] Contrary to the discussion on page 4 of the Office Action, Hirayama does not teach "properties such as [sic, a] quantity of bacterial contamination are calculated at column 2, lines 17-21 and lines 39-45" with respect claim 65.

G. Claim 70 cannot be anticipated under 35 U.S.C. § 102(b) by Hirayama

Independent claim 70 also cannot be anticipated by Hirayama because this reference also fails to teach each and every recited element.

Independent claim 70 claims a method for facilitating water treatment comprising providing a system comprising a pressurizable reservoir system. Hirayama discloses tanks fluidly connected to a point of entry but does not disclose a pressurizable reservoir system. Further, no valid explanation has been set forth that Hirayama's tanks must necessarily be pressurized. Instead, Hirayama discloses that the pumps are fluidly connected downstream from the tanks. When considered as a whole, one skilled in the art would recognize that the reference discloses that the tanks are not pressurized because Hirayama utilizes pumps downstream of the tanks to facilitate delivery of the water to downstream unit operations. Indeed, without the use of the pumps, no fluid flow can be effected, which leads to the conclusion that the fluid in the tanks is not pressurized.

Thus, independent claim 70 cannot be anticipated by Hirayama because the reference cannot disclose each and every recited limitation.

H. Claims 62 and 65-67 cannot be anticipated under 35 U.S.C. § 102(e) by Willman

Independent claim 62 cannot be anticipated by Willman because Willman does not disclose each and every limitation recited in these claims. Willman does not disclose a method for treating water comprising accumulating water from a point of entry at a pressure that is above atmospheric pressure and adjusting at least one operating parameter of the electrochemical device. Notably, no cogent discussion has been presented that explains why Willman discloses a method that must necessarily accumulate water from a point of entry at a pressure that is above atmospheric pressure. Willman delivers permeate or purified water from a reverse osmosis unit into a storage tank. Willman does not state that the tank is pressurized. Further, no explanation has been presented as to why the storage tank must necessarily accumulate water from a point of entry at a pressure that is above atmospheric pressure.

In FIG. 3 of Willman, transfer pump 58 is disposed downstream of storage tank 26. This flow configuration cannot lead to a conclusion that the tank accumulates water from a point of entry at a pressure that is above atmospheric pressure because a pressurized tank would not require a pump to effect water delivery.

In FIG. 4, Willman explains that purified water from reverse osmosis unit 36 is delivered to storage tank 26 by way of three-way valve 93. Willman, however, does not state that storage tank 26 accumulates water from a point of entry at a pressure that is above atmospheric pressure. Indeed, it is equally speculative to conclude that storage tank 26 is elevated relative to product dispenser 28 and water from storage tank 26 flows into product dispenser 28 under hydrostatic pressure head as it is to presume that tank 26 is at a pressure that is above atmospheric pressure.

Therefore, independent claim 62 cannot be anticipated by Willman because the reference does not disclose each and every limitation recited therein.

Dependent claims 65-67 depend from independent claim 62. These claims cannot be anticipated by Willman for at least the same reasons. Further, each of these claims cannot be anticipated by Willman because the reference does not disclose the additional advantageous features respectively recited therein. For example, Willman does not disclose a method comprising calculating a desired property of the treated water or a method comprising adjusting a time delay between reversing cycles.

Therefore, dependent claims 65-67 cannot be anticipated by Willman because the reference does not disclose each and every respectively recited element.

I. Claim 69 cannot be anticipated under 35 U.S.C. § 102(e) by Willman

Dependent claim 69 depends from independent claim 68, which claims a system comprising a pressurized fluid reservoir in thermal communication with a heat exchanger. Independent claim 68, however, has not been rejected as being anticipated by Willman. Thus, as a matter of law, Willman cannot anticipate dependent claim 69. Further, Willman fails to disclose a system comprising a pressurized fluid reservoir in thermal communication with a heat exchanger. In FIG. 3, Willman discloses pump 58

downstream from storage tank 26. This flow configuration cannot lead to a conclusion that the tank accumulates water from a point of entry at a pressure that is above atmospheric pressure because a pressurized tank would not require a pump to effect water delivery.

In FIG. 4, Willman explains that purified water from reverse osmosis unit 36 is delivered to storage tank 26 by way of three-way valve 93. Willman, however, does not state that storage tank 26 accumulates water from a point of entry at a pressure that is above atmospheric pressure. Indeed, it is equally speculative to conclude that storage tank 26 is elevated relative to product dispenser 28 and water from storage tank 26 flows into product dispenser 28 under hydrostatic pressure head as it is to presume that tank 26 is at a pressure that is above atmospheric pressure.

Therefore, because Willman fails to disclose and every element recited in claim 69, Willman cannot anticipate dependent claim 69.

J. Claim 70 cannot be anticipated under 35 U.S.C. § 102(e) by Willman

Independent claim 70 cannot be anticipated by Willman because Willman fails to disclose each and every element recited therein. Independent claim 70 claims a method of facilitating water treatment comprising providing a system comprising a pressurizable reservoir system that is fluidly connectable to a point of entry and an electrochemical device that is fluidly connected to the pressurizable reservoir system and to a water distribution system. As previously noted, no discussion has been presented that explains why the storage tank of Willman must necessarily be pressurized. Willman, instead, discloses, with reference to FIG. 3, a recirculation path 52 including an ultraviolet light treatment unit 54 and a deionization module 56. Purified water product is pumped from storage tank 26 by a transfer pump 58 and returned to storage tank 26. (Willman at paragraph 0029.) Willman does not state that tank 26 is pressurizable.

Further, there is no reasoned explanation as to why tank 26 must necessarily be pressurizable. A statement that Willman discloses accumulating water from a point of use (source 24) in a storage tank 26 that is pressurized by way of booster pump 16 cannot

support a conclusion that tank 26 must necessarily be pressurized or pressurizable because it is equally speculative to assume that tank 26 stores water at atmospheric pressure and flow of the purified water product can be effected by elevating tank 26, at atmospheric pressure, above dispenser 28.

Thus, because Willman does not disclose a method comprising providing a pressurizable reservoir and there has been no reasoned analysis to explain why Willman inherently discloses a method comprising providing a pressurizable reservoir, the reference cannot disclose each and every element recited in independent claim 70. Therefore, independent claim 70 cannot be anticipated by Willman.

K. Claim 26 is not unpatentable under 35 U.S.C. § 103(a) over Willman in view of Rela

Claim 26 depends from independent claim 21 and would not have been obvious over Willman in view of Rela. As noted above, Willman fails to disclose each and every element recited in independent claim 21. In particular, Willman does not disclose a treatment system comprising an auxiliary use fluidly connected to a waste stream from an electrochemical device. Instead, Willman teaches providing purified water to the alleged auxiliary use (product dispenser) 104. Rela also fails to disclose the recited element and thus fails to cure the deficiencies of Willman. The rejection is thus improper because no *prima facie* case of obviousness has been set forth since the references fail to teach or suggest all the elements recited in dependent claim 26. 35 U.S.C. § 103(a), MPEP §§ 2141, 2142 ("To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.")

Thus, dependent claim 26 would not have been obvious over Willman in view of Rela because any alleged combination of the references would fail to teach each and every element recited therein.

L. Claims 27 and 42 are not unpatentable under 35 U.S.C. § 103(a) over Willman in view of Sato

Dependent claims 27 and 42 would not have been obvious over Willman in view of Sato. Dependent claim 27 depends from independent claim 21 which claims a treatment system comprising an auxiliary use fluidly connected to a waste stream from an electrochemical device. Dependent claim 42 depends from independent claim 40 which claims a method for treating water comprising transferring a portion of discharge water produced by an electrochemical device to an auxiliary use. The discharge water is waste water that is a byproduct of producing the purified water product which is distributed from a reservoir system to a point of use.

The rejection is improper because no teaching, suggestion, or motivation has been set forth to utilize the systems or methods of Willman or Sato to provide treated water to an appliance or a household. Moreover, these claims depend from independent claims 21 and 40, respectively, which as noted above, cannot be anticipated by Willman. In particular, Willman does not disclose a system comprising an auxiliary use fluidly connected to a waste stream from the electrochemical device. Willman also does not disclose a method for treating water comprising transferring a portion of discharge water, waste water from the electrochemical device, to an auxiliary use. Sato fails to compensate for the deficiencies of Willman. Thus any combination of these references would fail to teach each and every element recited in dependent claims 27 and 42.

Further, no teaching or suggestion has been properly set forth to modify the disclosure of Willman in the manner claimed to produce treated water for household use, *e.g.*, in an irrigation application. As noted, Willman discloses a water purification system and method for producing high-purity, laboratory-quality product water. (See Willman at Abstract and at paragraph 0006.) Sato similarly seeks to produce ultra pure water. (See,

for example, Sato at Column 1, lines 5 to 8 and at column 2, lines 17 to 21.) Although Sato mentions that deionized water (but not ultra pure water) can be used for household purposes, Sato emphasizes that the "object of the present invention [is] to provide an electrodeionization apparatus which removes silica and boron at extremely high ratio, a method of operating the same, and a system employing the electrodeionization apparatus for producing ultra pure water." (Sato at column 2, lines 16-21.) An ordinarily skilled artisan, however, would have recognized that there are notable differences between ultra pure water and "deionized water for household" use. Significantly, Sato repeatedly emphasizes that the water produced by the disclosed system provides ultra pure water, without any teaching or suggestion that the produced ultra pure water can be suitable for household use. The prosecution history of Willman further provides compelling evidence that an ordinarily skilled artisan would realize the differences in requirements between water for ultra-pure purposes and water for purposes which do not require high purity. In particular, Willman notes that high purity water is produced to meet standards set forth under ASTM D1193, which distinguishes it over non-high purity water. (See pages 11 to 12 of an Amendment filed in U.S. Patent Publication No. 20040118780, filed January 7, 2005, a copy of which is attached as Evidence Appendix.) Thus, it is clear that ultra pure water differs from water for household use. Significantly, a person of ordinary skill in the art would not have utilized ultra pure water to provide for household needs because ultra pure water is extremely corrosive and, if introduced in household structures, would corrode the conventional household water distribution system. In view of the explicitly stated objects of the teachings of Willman and Sato, *i.e.*, to provide ultra-pure water, no *prima facie* case of obviousness can be made because one skilled in the art would not have modified the disclosure of Willman, which is directed to producing high purity water, and modify it to produce water for household use because the water quality requirements of each differ significantly.

Therefore, claims 27 and 42 would not have been obvious over Willman in view of Sato because the combined disclosures cannot teach, suggest, nor would have resulted in a system comprising an auxiliary use fluidly connected to a waste stream from an

electrochemical device or an appliance, or in a method comprising transferring a portion of the discharge water to an auxiliary use or distributing water to a household.

M. Claim 28 is not unpatentable under 35 U.S.C. § 103(a) over Willman in view of Hirayama

Dependent claim 28 would not have been obvious over Willman in view of Hirayama. Dependent claim 28 claims a treatment system as in independent claim 21 and further comprising a heat exchanger thermally connected to the reservoir system. As noted above, Willman fails to disclose each and every element of independent claim 21, from which claim 28 depends. In particular, Willman does not disclose a system comprising an auxiliary use fluidly connected to a waste stream from an electrochemical device. Hirayama also does not disclose a system comprising an auxiliary use fluidly connected to a waste stream from an electrochemical device and thus fails to cure the deficiencies of Willman. Therefore, even if the references could have been combined, any resultant combination would fail to disclose each and every element of dependent claim 28.

The alleged *prima facie* case of obviousness is also improper because no teaching or motivation has been properly set forth to utilize the heat exchanger of Hirayama in the system disclosed by Willman. Indeed, incorporating the heat exchanger of Hirayama in the system disclosed by Willman would unduly require further experimentation or would run contrary to the teachings of the references.

Hirayama discloses heating water prior to the reverse osmosis unit and prior to the electrodeionization device. Separate heat exchangers are required because, unlike the reverse osmosis unit, the disclosed electrodeionization device cannot tolerate elevated temperatures. Hirayama thermally "de-couples" these unit operations by introducing one or more intermediate unit operations therebetween to prevent damage to the electrodeionization device. In FIGS. 1, 2, 3, and 4 of Willman, however, the capacitive deionization device is used to directly treat a reject stream from the reverse osmosis unit. In this configuration, the capacitive deionization device is directly fluidly connected, and

hence directly thermally connected to the reverse osmosis unit by way of a recirculation path. Modifying this configuration to incorporate a heat exchanger to raise the temperature sufficient to disinfect the reverse osmosis unit would damage the capacitive deionization device. Thus, one skilled in the art would not have been motivated to utilize the heat exchanger as disclosed by Hirayama in the system disclosed by Willman because the ordinarily skilled artisan would have recognized the likelihood of damaging the electrochemical devices in the system of Willman.

Modifying the systems disclosed by Willman to thermally couple a heat exchanger to a storage tank would also defeat the intended purpose of the references.

Willman seeks to reduce the overall discharge water burden by further purifying the reject stream from a reverse osmosis device. Willman in effect reduces the volume of the waste stream by increasing the concentration of undesirable species discharged to drain by utilizing the capacitive deionization module. In the systems shown in FIGS. 1, 2, 3, and 4 of Willman, storage tank 26 is downstream of the reverse osmosis unit and the capacitive deionization module(s).

Hirayama provides hot water at a first temperature to disinfect the reverse osmosis device and hot water at another temperature, lower than the first hot water temperature, to disinfect the electrodeionization apparatus. Even if the references could have been combined to utilize the disinfecting techniques of Hirayama on the systems disclosed by Willman, a person skilled in the art would have heated water from storage tank 26 which is disposed downstream of the reverse osmosis unit. As such no hot water could be delivered to effect disinfection of such unit operations. Thus, a person skilled in the art would have recognized that modifying the systems disclosed by Willman would not satisfy the purpose for the combination in the first place.

Therefore, dependent claim 28 would not have been obvious over Willman in view of Hirayama because any alleged combination of the references would not have resulted in the invention as claimed and because any motivation to combine the references would run contrary to the objects of the references.

N. Claims 29 and 43 are not unpatentable under 35 U.S.C. § 103(a) over Willman in view of Arba

Dependent claims 29 and 43 would not have been obvious over Willman in view of Arba.

Dependent claim 29 depends from independent claim 21 which cannot be anticipated by Willman because the reference fails to disclose each and every element recited therein. In particular, Willman fails to disclose a treatment system comprising an auxiliary use fluidly connected to a waste stream from an electrochemical device. Arba also fails to disclose this recited element. Further dependent claim 29 claims the system of independent claim 21 wherein the auxiliary use comprises an irrigation system. Arba also does not disclose this feature of the present invention.

Dependent claim 43 depends from independent claim 40 which cannot be anticipated by Willman because the reference fails to disclose each and every element recited therein. In particular, Willman does not disclose a method for treating water comprising transferring a portion of discharge water (produced by an electrochemical device) to an auxiliary use. Arba fails to disclose this recited step. Further, dependent claim 43 claims the method of independent claim 40 wherein transferring the discharge water comprises transferring at least a portion of the discharge water to an irrigation system. Arba also fails to disclose this feature of the invention.

There is no teaching or suggestion in the references to utilize water as an auxiliary use, which as noted above is typically discharge water as a waste stream from the electrochemical device. Thus, the *prima facie* case of obviousness is improper. 35 U.S.C. § 103(a), MPEP §§ 2141, 2142 (The combined prior art references must teach or suggest all the claim limitations.)

Significantly, Arba discloses producing highly purified water. (Arba at column 1, lines 7 to 10.) In particular, Arba discloses systems and techniques that produce sterile water for injection water or tissue irrigation. The water for irrigation produced according to Arba cannot be from a waste stream because it would be unsuitable to irrigate tissue. In contrast, the invention as claimed in dependent claims 29 and 43 involves utilizing

waste streams to irrigate, for example, vegetation, which does not implicate any purity or sterilization requirements.

Therefore, claims 29 and 43 would not have been obvious over Willman in view of Arba because the rejection is improper for failing to properly set forth a *prima facie* case of obviousness since the alleged combination would fail to teach each and every element respectively recited in the claims.

O. Claims 63 and 64 are not unpatentable under 35 U.S.C. § 103(a) over Hirayama in view of Sato

Dependent claims 63 and 64 would not have been obvious over Hirayama in view of Sato. These dependent claims depend from independent claim 62. As noted above however, independent claim 62 cannot be anticipated by Hirayama because the reference fails to disclose each and every element recited therein. In particular, Hirayama does not disclose a method comprising a method comprising accumulating water from a point of entry at a pressure that is above atmospheric pressure and adjusting at least one operating parameter of the electrochemical device. Sato fails to cure the deficiencies of Hirayama.

Further, Sato and Hirayama disclose systems and techniques relevant to producing ultra pure water. Thus, even if the references could have been combined, the references would be relevant to providing ultra pure for pharmaceutical and semiconductor fabrication operations but not deionized water for household use.

Thus, even if the teachings of the references could have been combined, any alleged combination would likewise fail to recite each and every element dependent claims 63 and 64. Therefore, claims 63 and 64 would not have been obvious over Hirayama in view of Sato because the rejection is improper for failing to set forth a *prima facie* case of obviousness.

P. Conclusion

For the reasons provided above, each of the rejections is improper and should be reversed. Appellant respectfully requests reversal of the rejections and issuance of a Notice of Allowance.

VIII. Claims Appendix: Claims as Appealed (37 C.F.R. § 41.37(c)(1)(viii))

Listing of Claims

1-20. (Canceled)

21. (Previously Presented) A treatment system comprising:
a reservoir system fluidly connected to a point of entry;
an electrochemical device fluidly connected to the reservoir system;
a point of use fluidly connected to the reservoir system; and
an auxiliary use fluidly connected to a waste stream from the electrochemical device.

22. (Original) The treatment system of claim 21 wherein the reservoir system is pressurized.

23. (Original) The treatment system of claim 21 further comprising a pretreatment system fluidly connected upstream of the electrochemical device.

24. (Previously presented) The treatment system of claim 23 wherein the pretreatment system comprises a reverse osmosis device.

25. (Original) The treatment system of claim 23 wherein the pretreatment system comprises a carbon filter.

26. (Original) The treatment system of claim 21 further comprising a controller for regulating at least one operating parameter of the treatment system.

27. (Original) The treatment system of claim 21 wherein the point of use comprises an appliance.

28. (Original) The treatment system of claim 21 further comprising a heat exchanger thermally connected to the reservoir system.

29. (Original) The treatment system of claim 21 wherein the auxiliary use comprises an irrigation system.

30-39. (Canceled)

40. (Previously Presented) A method for treating water comprising:

introducing water from a point of entry to a reservoir system;

removing at least a portion of any undesirable species from the water in the reservoir system in an electrochemical device to produce treated water and discharge water;

transferring at least a portion of the treated water from the electrochemical device to the reservoir system;

transferring a portion of the discharge water to an auxiliary use; and

distributing a portion of the treated water from the reservoir system to a point of use.

41. (Original) The method of claim 40 wherein the reservoir system is pressurized.

42. (Original) The method of claim 40 wherein distributing a portion of the treated water comprises distributing water to a household.

43. (Original) The method of claim 40 wherein transferring the discharge water to the auxiliary use comprises transferring at least a portion of the discharge water to an irrigation system.

44. (Original) The method of claim 40 further comprising pretreating the water before removing the at least a portion of the any undesirable species from the water.

45. (Original) The method of claim 40 further comprising adjusting an operating parameter of the electrochemical device.

46-50. (Canceled)

51. (Previously presented) A water treatment system comprising:

means for accumulating water from a water source at a pressure above atmospheric pressure;

an electrochemical device fluidly connected to the means for accumulating water;

means for heating the water; and

a household water distribution system.

52. (Canceled)

53. (Original) The system of claim 51 further comprising a pretreatment system fluidly connected upstream of the means for accumulating water.

54. (Previously presented) The system of claim 51 further comprising a means for adjusting an operating parameter of at least one of the electrochemical device, the means for accumulating water and the household water-distribution system.

55-61. (Canceled)

62. (Previously Presented) A method for treating water comprising:

accumulating water from a point of entry at a pressure that is above atmospheric pressure;

providing an electrochemical device;

transferring at least a portion of the accumulated water to the electrochemical device;

removing at least a portion of any undesirable species from the water in the electrochemical device to produce a treated water; and

adjusting at least one operating parameter of the electrochemical device.

63. (Original) The method of claim 62 further comprising supplying at least a portion of the treated water to a household appliance.

64. (Original) The method of claim 63 further comprising heating at least a portion of the treated water prior to supplying the water to a household appliance.

65. (Original) The method of claim 62 further comprising calculating a desired property of the treated water.

66. (Original) The method of claim 62 further comprising reversing a polarity of an electric field applied across the electrochemical device.

67. (Original) The method of claim 62 further comprising adjusting a time delay between reversing cycles.

68. (Previously presented) A system comprising:

a pressurized fluid reservoir in thermal communication with a heat exchanger; and

a fluid treatment device fluidly connected to the pressurized fluid reservoir,

wherein the fluid treatment device comprises a device selected from the group consisting of an electrochemical device and a reverse osmosis device.

69. (Previously presented) The system of claim 68 wherein the fluid treatment device comprises an electrochemical device.

70. (Original) A method for facilitating water treatment comprising:

providing a system comprising a pressurizable reservoir system that is fluidly connectable to a point of entry and an electrochemical device fluidly connected to the pressurizable reservoir system and fluidly connectable to a water distribution system.

IX. Evidence Appendix (37 C.F.R. § 41.37(c)(1)(ix))

A copy of pages 10-12 of the Amendment under 37 C.F.R. § 1.111 filed on January 7, 2005 during the prosecution of Willman are attached.

REMARKS

This amendment is responsive to the non-final Office Action mailed on September 9, 2004. Claims 1-35 are pending. Claims 1, 13, and 35 have been amended for purposes not relating to patentability and are not made in response to the rejections made by the Examiner in the Office Action. In view of the foregoing amendments, as well as the following remarks, Applicants respectfully submit that this application is in complete condition for allowance and request reconsideration of the application in this regard.

Claims 1-3, 6-9, 13-21, 25-27, and 30-35

Claims 1-3, 6-9, 13-21, 25-27, and 30-35 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,110,375 (Bacchus et al.) or U.S. Patent No. 4,332,685 (Nowlin et al.) in view of U.S. Patent No. 6,462,935 (Shuie et al.). Claims 1, 13, and 26 are the only independent claims from among the group of rejected claims. The Examiner admits that neither *Bacchus et al.* nor *Nowlin et al.* discloses a "'capacity deionization module or unit'". However, the Examiner contends that it would have been obvious to one of ordinary skill in the art to modify either primary reference to substitute a "capacitor deionization module or flow through capacitor" as taught by *Shuie et al.* for the ion exchange treatment unit disclosed in either *Bacchus et al.* or *Nowlin et al.* Applicants respectfully disagree for the reasons set forth below.

Shuie et al. does not provide a sufficient motivation or suggestion for substituting a capacitive deionization module for a deionization unit having a resin bed. Specifically, the proposed modification to either *Bacchus et al.* or *Nowlin et al.* would change the principle of

operation of these respective water purification systems. *See* MPEP § 2143.01. Hence, the teachings of the references applied by the Examiner are not sufficient to render the claims *prima facie* obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

The proposed modification to *Bacchus et al.* would change the principle of operation of the disclosed water purification system. The purification system disclosed in *Bacchus et al.* is intended to produce what is known as 18 Megaohm-cm water (e.g., Type I water under ASTM Standard D1193) water that has an extremely high purity due to ion removal by the deionization (DI) module (30) and the reverse osmosis (RO) unit (12). Figures 3A and 3B of *Bacchus et al.* and the written description at column 4, lines 9-12 clearly evidence the desirability of the disclosed purification system to produce 18 Megaohm water. If the capacitive deionization (CDI) module of *Shuie et al.* were simply substituted for the DI module (30) in *Bacchus et al.*, the purified water would be produced that has significantly more ions and a lower resistivity of 1 Megaohm-cm (i.e., Type II water under ASTM Standard D1193). The CDI module is inherently less efficient than the DI module (30) at removing ions.

In addition, CDI is a separation technology and DI is an absorption technology. A person of ordinary skill in the art would not appreciate that an absorption (adsorption) technology could be replaced by a separation technology. Periodically, water purification must be discontinued in *Bacchus et al.* to regenerate or replace the resin in the DI module (30) because the ability to absorb ions is eventually lost as the resin becomes saturated. CDI modules are simply regenerated by reversing the electric field and sending the ion-concentrated water to drain. Because the proposed modification to *Bacchus et al.* would change the principle of operation of

Bacchus et al., the Examiner has failed to establish *prima facie* obviousness. For at least this additional reason, Applicants request that the Examiner withdraw the rejection of claim 1.

Because claims 2-12 depend from independent claim 1, Applicants submit that those claims are also patentable for at least the same reasons discussed above. Furthermore, these claims recite unique combinations of elements not taught, disclosed or suggested by the references of record.

The proposed modification to *Bacchus et al.* would change the principle of operation of the disclosed water purification system. The purification system disclosed in *Nowlin et al.* is intended to produce water for home use. The water softener (11) softens hard feed water by an ion exchange process that replaces magnesium and calcium with sodium. *See* column 1, lines 9-12. The resistivity of the water output from the water softener (11) in line (20) and provided to the inlet of the RO unit (12) through lines (22) and (27) will be either the same, or increased, relative to the resistivity of the feed water flowing into the system through line (15). Typically, such untreated hard water will have a resistivity of a few kilo-ohms. The treated water discharged from the water softener (11) will have a similar resistivity to untreated hard water because only the type of ion is changed (i.e., from magnesium and calcium to sodium). In other words, the water softener (11) does not remove ions from the feed stream of hard water. A CDI module detains charged species using an electric field, which represents a very different mechanism of operation than the water softener (11). If the capacitive deionization (CDI) module of *Shuie et al.* were simply substituted for the water softener (11) in *Nowlin et al.*, the purified water would have a resistivity of about 1 Megaohm-cm because it is significantly more depleted of ions. A person of ordinary skill in the art would not make the substitution suggested

X. Related Proceedings Appendix (37 C.F.R. § 41.37(c)(1)(x))

None.

XI. Conclusion

For the reasons provided above, the rejections are improper and should be reversed. Appellant respectfully requests reversal of the rejections and issuance of a Notice of Allowance. If there is any additional fee occasioned by this filing including an extension fee that is not covered by an accompanying payment, please charge any deficiency to Deposit Account No. 50/2762, ref. No.: I0168-707619.

Respectfully submitted,
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